AMENDMENT TO THE CLAIMS:

This listing of claims will replace all prior versions of claims in the application:

LISTING OF CLAIMS:

1. (CURRENTLY AMENDED) A magnetic head having a pinned area, a free area, and a nanoconstricted area encompassing portions of the pinned and free areas, the head comprising:
a first layer of magnetic material extending along the pinned and free areas;
an AP coupling layer extending along the pinned area; and
a third layer of magnetic material, an active portion of the third layer extending along the pinned area but not along the free area;
wherein the first and third layers have magnetic moments that are self-pinned antiparallel to each other in the pinned area and a portion of the nanoconstricted area encompassing the pinned area;
wherein the nanoconstricted area has a height that is less than areas immediately outside the nanoconstricted area.

2. (ORIGINAL) A head as recited in claim 1, wherein a height of the nanoconstricted area is less than about 100 nanometers.

3. (ORIGINAL) A head as recited in claim 1, wherein a height of the nanoconstricted area is less than about 50 nanometers.

4. (ORIGINAL) A head as recited in claim 1, wherein a height of the nanoconstricted area is about 10 to 30 nanometers.

5. (ORIGINAL) A head as recited in claim 1, wherein the third layer has been removed from the free area by at least one of etching and milling.

6. (ORIGINAL) A head as recited in claim 1, wherein a portion of the third layer in the free area has been rendered nonmagnetic.

7. (ORIGINAL) A head as recited in claim 6, wherein the portion of the third layer in the free area has been rendered nonmagnetic by oxidation.

8. (CURRENTLY AMENDED) A magnetic head having a pinned area, a free area, and a nanoconstricted area encompassing portions of the pinned and free areas, the head ~~as recited in claim 1, further~~ comprising:
a first layer of magnetic material extending along the pinned and free areas;
an AP coupling layer extending along the pinned area; and
a third layer of magnetic material, an active portion of the third layer extending along the pinned area but not along the free area;
a hard bias layer positioned outside the free area for stabilizing the first layer in the free area;
wherein the first and third layers have magnetic moments that are self-pinned antiparallel to each other in the pinned area and a portion of the nanoconstricted area encompassing the pinned area.

9. (ORIGINAL) A head as recited in claim 1, wherein the first layer includes NiFe.

10. (ORIGINAL) A head as recited in claim 1, wherein the third layer includes CoFe.

11. (ORIGINAL) A head as recited in claim 1, wherein the AP coupling layer includes Ru.

12. (CURRENTLY AMENDED) A magnetic head having a pinned area, a free area, and a nanoconstricted area encompassing a portion of the free area and a greater portion of the pinned area, the head comprising:
a first layer of magnetic material extending along the pinned and free areas;

an AP coupling layer extending along the pinned area; and

a third layer of magnetic material extending along the pinned area but not into the free area;

wherein the first and third layers have magnetic moments that are self-pinned antiparallel to each other in the pinned area and the nanoconstricted area;

wherein the nanoconstricted area has a height that is less than areas immediately outside the nanoconstricted area.

13. (ORIGINAL) A head as recited in claim 12, wherein a height of the nanoconstricted area is less than about 100 nanometers.

14. (ORIGINAL) A head as recited in claim 12, wherein a height of the nanoconstricted area is less than about 50 nanometers.

15. (ORIGINAL) A head as recited in claim 12, wherein a height of the nanoconstricted area is about 10 to 30 nanometers.

16. (ORIGINAL) A head as recited in claim 12, wherein the third layer has been removed from the free area by at least one of etching and milling.

17. (CURRENTLY AMENDED) A head as recited in claim 12, wherein ~~a portion of the third layer in the free area has been rendered nonmagnetic~~ a junction of the free and pinned areas is positioned in the nanoconstricted area, wherein the junction is positioned more towards the pinned area relative to a center of the nanoconstricted area.

18. (CURRENTLY AMENDED) A head as recited in claim [[17]] 12, wherein ~~the portion of the third layer in the free area has been rendered nonmagnetic by oxidation~~ a junction of the free and pinned areas is positioned in the

nanoconstricted area, wherein the junction is positioned more towards the free area relative to a center of the nanoconstricted area.

19. (ORIGINAL) A head as recited in claim 12, wherein the first layer includes NiFe.

20. (ORIGINAL) A head as recited in claim 12, wherein the third layer includes CoFe.

21. (ORIGINAL) A head as recited in claim 12, wherein the AP coupling layer includes Ru.

22. (CURRENTLY AMENDED) A magnetic head having a pinned area, a free area, and a nanoconstricted area encompassing a portion of the pinned area and a greater portion of the free area, the head comprising:
a first layer of magnetic material extending along the pinned and free areas;
an AP coupling layer extending along the pinned area; and
a third layer of magnetic material extending along the pinned area but not into the free area;
wherein the first and third layers have magnetic moments that are self-pinned antiparallel to each other in the pinned area;
wherein the nanoconstricted area has a height that is less than areas immediately outside the nanoconstricted area.

23. (ORIGINAL) A head as recited in claim 22, wherein a height of the nanoconstricted area is less than about 100 nanometers.

24. (ORIGINAL) A head as recited in claim 22, wherein a height of the nanoconstricted area is less than about 50 nanometers.

25. (ORIGINAL) A head as recited in claim 22, wherein a height of the nanoconstricted area is about 10 to 30 nanometers.

26. (ORIGINAL) A head as recited in claim 22, wherein the third layer has been removed from the free area by at least one of etching and milling.

27. (CURRENTLY AMENDED) A head as recited in claim 22, wherein ~~a portion of the third layer in the free area has been rendered nonmagnetic~~ a junction of the free and pinned areas is positioned in the nanoconstricted area, wherein the junction is positioned more towards the pinned area relative to a center of the nanoconstricted area.

28. (CURRENTLY AMENDED) A head as recited in claim [[27]] 22, wherein ~~the portion of the third layer in the free area has been rendered nonmagnetic by oxidation~~ a junction of the free and pinned areas is positioned in the nanoconstricted area, wherein the junction is positioned more towards the free area relative to a center of the nanoconstricted area.

29. (ORIGINAL) A head as recited in claim 22, wherein the first layer includes NiFe.

30. (ORIGINAL) A head as recited in claim 22, wherein the third layer includes CoFe.

31. (ORIGINAL) A head as recited in claim 22, wherein the AP coupling layer includes Ru.

32. (ORIGINAL) A magnetic storage system, comprising:
magnetic media;
at least one head for reading from and writing to the magnetic media, each head having:

a sensing element having the structure recited in claim 1;

a write element coupled to the sensor;

a slider for supporting the head; and

a control unit coupled to the head for controlling operation of the head.